

What is claimed is:

1. A position and/or movement sensor for measuring a position or movement of a first object relative to a second object, the sensor comprising:

5 a measuring device including

a first member coupled to the first object;

a second member coupled to the second object; and

a first spring arrangement including one or more first spring elements coupled between the first and second members;

10 one or more stop members for limiting movement of the first member relative to the second member in at least one linear direction and/or about at least one pivot axis; and

a second spring arrangement including one or more second spring elements coupled between the first member and the first object;

15 wherein a spring constant of the second spring arrangement is greater than a spring constant of the first spring arrangement in at least one linear direction or about at least one pivot axis.

2. The position and/or movement sensor of claim 1, wherein the spring constant of the second spring arrangement is at least double the spring constant of the first spring arrangement in the at least one linear direction or about the at least one pivot axis.

25 3. The position and/or movement sensor of claim 1, wherein the one or more stop members comprise at least one stop bolt securely connected to one of the first member and second member.

4. The position and/or movement sensor of claim 3, comprising a plurality of at least three stop bolts.

30 5. The position and/or movement sensor of claim 3, wherein the one or more stop members limit linear displacement of the first member relative to the second member in a direction perpendicular to a longitudinal axis of the stop bolt.

35 6. The position and/or movement sensor of claim 3, wherein the one or more stop members limit pivotal displacement of the first member relative to the second member about an axis extending essentially parallel to a longitudinal axis of the stop bolt.

7. The position and/or movement sensor of claim 3, wherein the one or more stop members limit linear displacement of the first member relative to the second member in a direction parallel to a longitudinal axis of the stop bolt.

5 8. The position and/or movement sensor of claim 3, wherein the one or more stop members limit pivotal displacement of the first member relative to the second member about an axis extending essentially perpendicular to a longitudinal axis of the stop bolt.

9. The position and/or movement sensor of claim 1, wherein at least one of the first and
10 second members comprises a printed circuit board.

10. The position and/or movement sensor of claim 1, wherein the one or more second spring elements comprise one or more of the following: a helical spring, a moulded elastomeric member, a cast resin member.

15 11. The position and/or movement sensor of claim 1, wherein the one or more first spring elements comprise one or more of the following: a helical spring, a moulded elastomeric member, a cast resin member.

20 12. The position and/or movement sensor of claim 1, further comprising a plurality of optoelectronic measuring cells for detecting relative movement or position in six degrees of freedom.

25 13. The position and/or movement sensor of claim 12, wherein the measuring cells are angularly distributed about a center.

14. The position and/or movement sensor of claim 13, wherein the measuring cells are arranged in pairs with the measuring cells in each pair being disposed one above another, and wherein the pairs of measuring cells are arranged at regular intervals about the center.

30 15. The position and/or movement sensor of claim 12, wherein each measuring cell comprises:

a light-emitting member;

a position-sensitive detector disposed in a beam path of the light-emitting member;

35 and

a slit diaphragm disposed in the beam path between the light-emitting member and the position-sensitive detector;

wherein a detector axis of the position-sensitive detector is aligned vertically to a slit direction of the slit diaphragm, and wherein one of the light-emitting member, slit diaphragm, and detector is movable relative to the other two.

5 16. The position and/or movement sensor of claim 15, wherein the slit diaphragm is arranged on one of the first and second members and the position-sensitive detector and the light-emitting member are arranged on the other one of the first and second members.

17. A force and/or torque sensor comprising a position and/or movement sensor of claim 1.